

Appendix F - Load Allocation Analysis

Technical Report for Rainbow Creek Nutrient TMDLs

January 27, 2005

Phosphorus Load Reductions

2009				
	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	27.4	21.0%	21.6	20
ag fields	35.4	21.0%	28.0	28
orchards	63.2	21.0%	49.9	50
park	0.2	25.0%	0.15	0.15
residential	125	21.0%	98.8	99
urban	11.2	24.5%	8.5	9
septic	0	0.0%	0	0
air depo.	2	0.0%	2.0	2
Caltrans	14	21.0%	11.1	11
UnID'd/Future PS			3.0	3
	278.4	20.0%	223.0	222.15
		Target WLA & Load Allocation		223

2013				
	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	27.4	42.0%	15.9	16
ag fields	35.4	42.0%	20.5	21
orchards	63.2	42.0%	36.7	37
park	0.2	50.0%	0.1	0.1
residential	125	41.0%	73.8	74
urban	11.2	50.0%	5.6	6
septic	0	0.0%	0	0
air depo.	2	0.0%	2.0	2
Caltrans	14	42.0%	8.1	8
UnID'd/Future PS			3.0	3
	278.4	40.0%	165.7	167.1
		Target WLA & Load Allocation		167

2017				
	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	27.4	62.0%	10.4	10
ag fields	35.4	62.0%	13.5	14
orchards	63.2	62.0%	24.0	24
park	0.2	50.0%	0.1	0.1
residential	125	62.0%	47.5	47
urban	11.2	50.0%	5.6	6
septic	0	0.0%	0	0
air depo.	2	0.0%	2.0	2
Caltrans	14	62.0%	5.3	5
UnID'd/Future PS			3.0	3
	278.4	60.0%	111.4	111.1
		Target WLA & Load Allocation		111

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Phosphorus Load Allocations

Final Target (0.1 mg/L) Load Reduction				
2021	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	27.4	90.0%	2.7	3
ag fields	35.4	90.0%	3.5	4
orchards	63.2	90.0%	6.3	6
park	0.2	50.0%	0.1	0.1
residential	125	90.0%	12.5	12
urban	11.2	50.0%	5.6	6
septic	0	0.0%	0	0
air depo.	2	0.0%	2	2
Caltrans	14	64.0%	5	5
UnID'd/Future PS			3	3
Total NPS & PS loads	278.4	85.0%	40.8	41.1
Background	116	Target WLA & Load Allocation		41
	394			

Shading indicates that the load reduction is at its maximum reduction/allocation.

Rationale for Allocation Decisions for Final Target TMDLs

1. The Source's ability to generate a load. This is based on coefficients/deposition rates and the land area. See Tables 3 and 4 below.
2. Proximity of Land Uses with high phosphorus concentrations in the creek. Monitoring data (Table B-2, Figure 7-2) and land use map (Figure A-2) were used.
3. The concentrations are highest in Rainbow Valley and decrease as one goes downstream indicating that land uses in the valley are primary sources. The tributaries are predominantly non-detect results with some positive results ranging from 0.06 - 0.38 mg/L. The elevated, positive results in WGT1, VMT1, and MGT1 indicate that the surrounding land uses are sources. It also indicates that sediment erosion and overland surface runoff are important factors in linking these sources to the creek.
4. Residential - has highest potential to generate load, followed by Ag, Orchards, & Nurseries based on load (coefficients * area). These land uses are also indicated based on monitoring data.
5. Residential areas are expected to have landscaping, private orchards, and large animals (e.g., horses, llamas).
6. Ag, Orch, Nurs. - fertilizer use and irrigation are inherent to the type of business. However, it should be feasible to exercise effective control over fertilizer and irrigation application and runoff.
7. Urban - is small in area with the highest coefficient. Large reductions will show small returns. However, urban uses can feasibly take measures to better manage and reduce runoff from properties.
8. Air Deposition is very small and not easily controllable from within watershed. No reductions are expected.
9. Septic tank disposal systems are assumed to not contribute P to creek.
10. Park - actions can be taken to reduce fertilizer use and over-irrigation of landscape, and to control runoff and erosion. Total reductions should be made at first compliance point because more than 4 years of phasing is unnecessary.
11. Urban and Caltrans are phased over the first two phase periods.
12. A placeholder of 2% of the TMDL (165 kg P/yr) is in place for unidentified and future point sources.
13. Land designated as "Preserve" is undeveloped/open land and is part of background.

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Phosphorus Reduction Time Schedule		Final WLA + LA Target:		41 kg/yr
completion date	load (kg/yr)	Percent reduction		compliance time
current ¹	278.4			
2009	223	0.2	20 percent	4 years
2013	167	0.4	20 percent	4 years
2017	111	0.6	20 percent	4 years
2021	41	0.85	25 percent	4 years
				16 years

¹ Current load estimate of nonpoint and point sources in the watershed (excludes background).

Table 3 Current TP Load Estimates*

	rank (lo - hi)	original loads
park	1	0.2
air dep.	2	3
urban	3	11.2
nurseries	4	27.4
ag fields	5	35.4
orchards	6	63.2
res.	7	125

* calculated by multiplying area and coefficient.

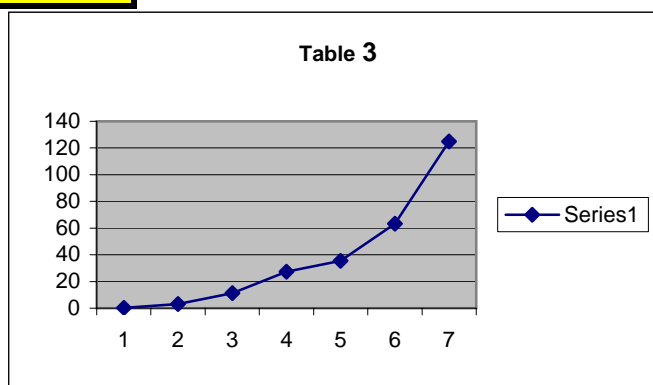


Table 4 - TP Land Use Coefficients

LU (hectares)	rank (lo - hi)	N coefficient
park (2)	1	0.1
nurseries (137)	2	0.2
ag fields (177)	3	0.2
orchards (316)	4	0.2
residential (250)	5	0.5
urban (14)	6	0.8

